Fig. 1

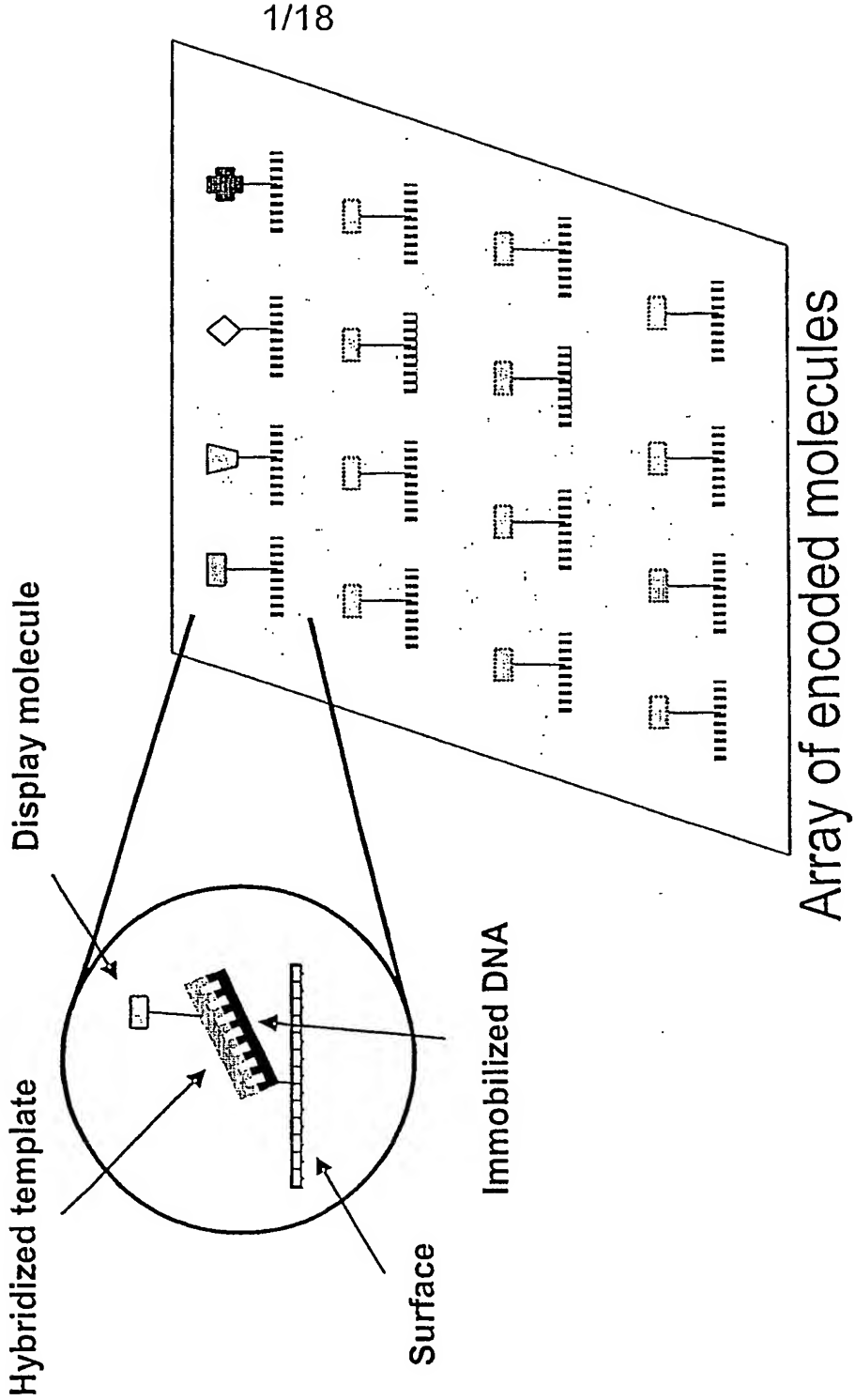

Array of encoded molecules
Display molecule
Hybridized template
Immobilized DNA
Surface

Fig. 2

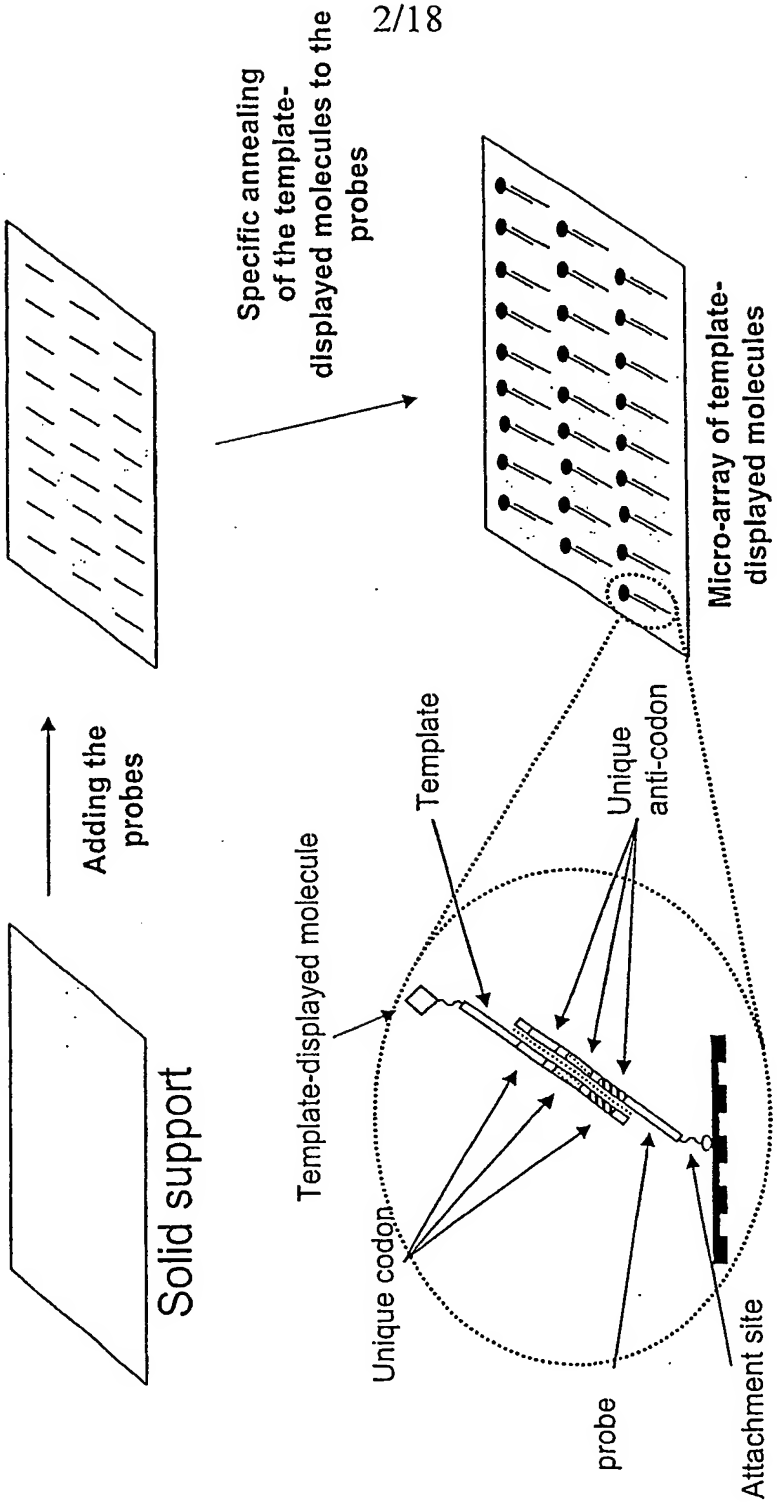

Solid support
Adding the probes
Specific annealing of the template-displayed molecules to the probes
Micro-array of template-displayed molecules
Template-displayed molecule
Template
Unique anti-codon
Unique codon
probe
Attachment site

Fig. 3

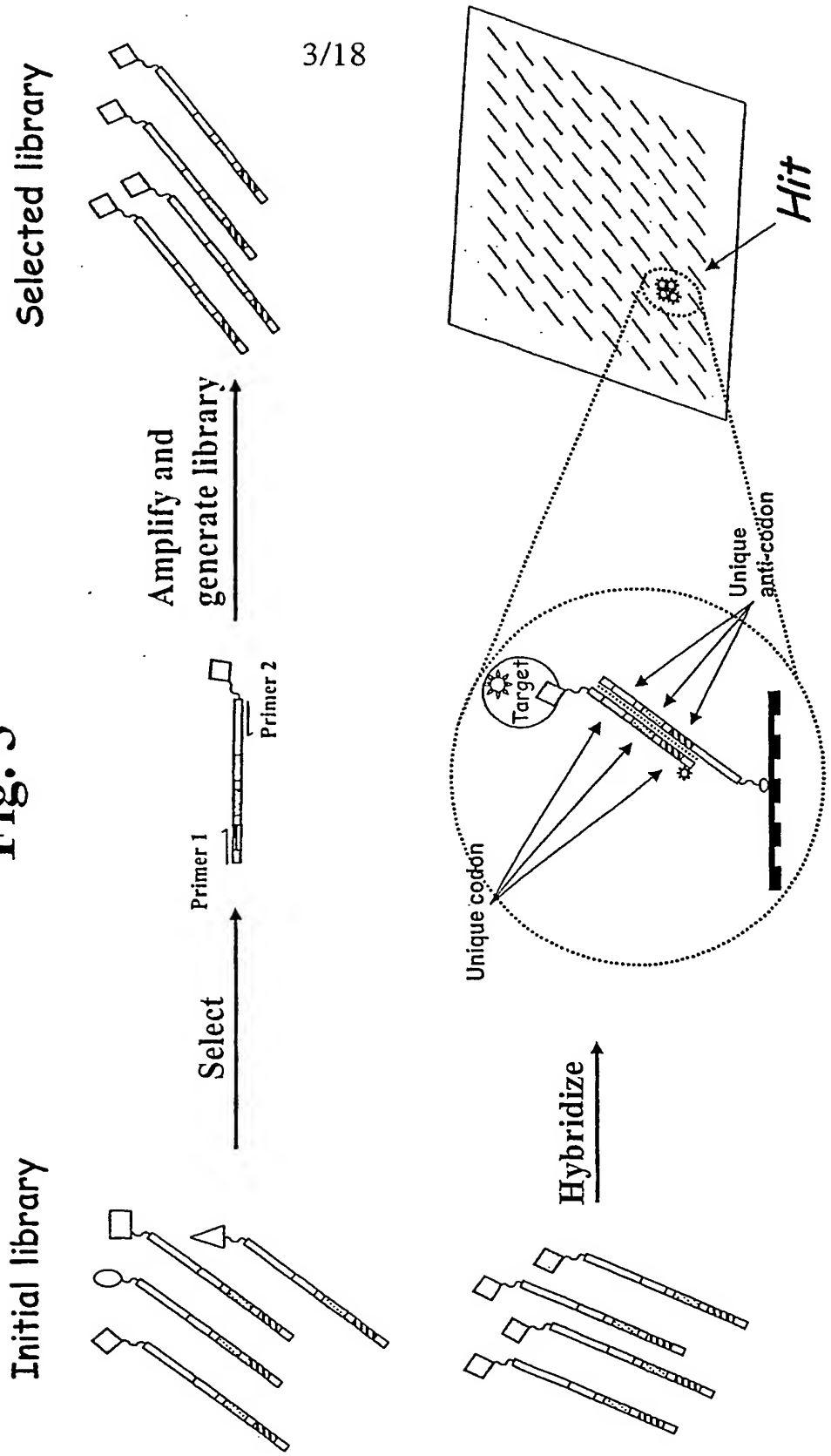
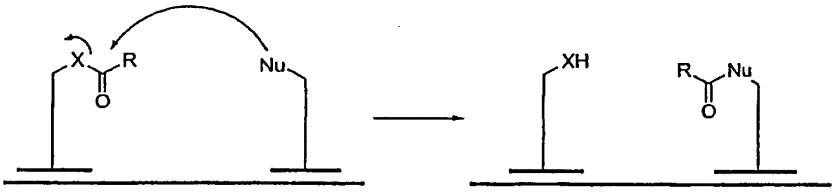

Initial library
Select
Primer 1
Primer 2
Amplify and generate library
Selected library
Hybridize
Hit
Target
Unique anti-codon
Unique codon

Fig. 4

A. Acylating monomer building blocks - principle



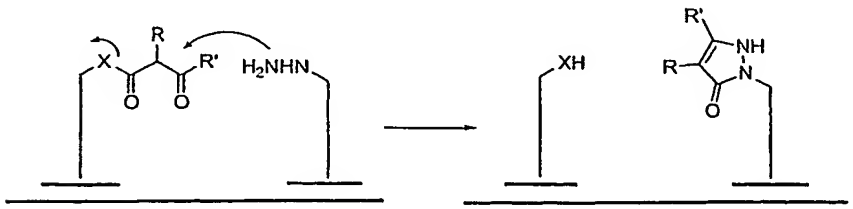
X = O, S Nu = Oxygen-, Nitrogen-, Sulfur- and Carbon Nucleophiles

B. Acylation

Amide formation by reaction of amines with activated esters

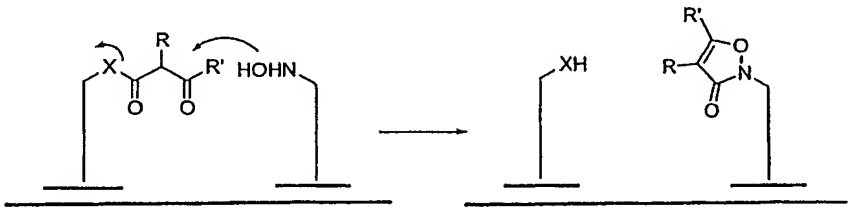
C. Acylation

Pyrazolone formation by reaction of hydrazines with β–Ketoesters



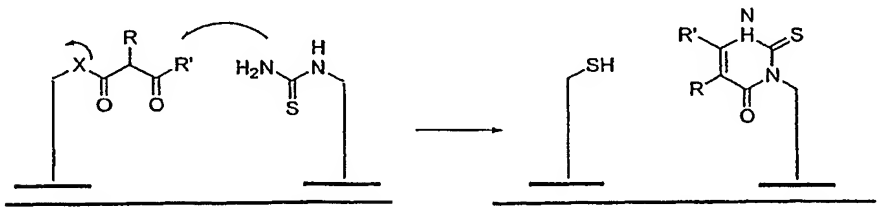
D. Acylation

Isoxazolone formation by reaction of hydroxylamines with β–Ketoesters



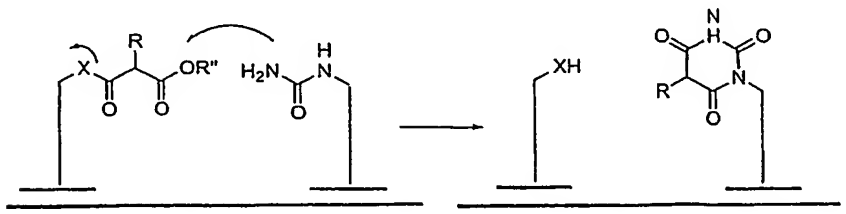
E. Acylation

Pyrimidine formation by reaction of thioureas with β–Ketoesters



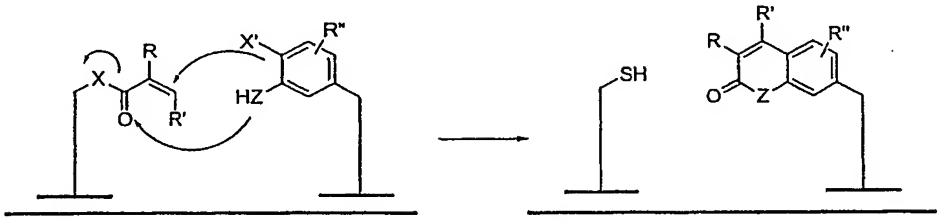
F. Acylation

Pyrimidine formation by reaction of ureas with Malonates



G. Acylation

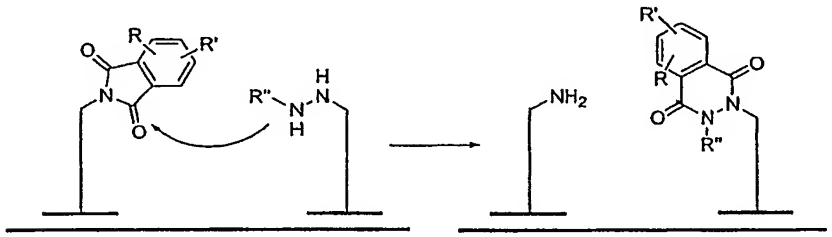
Coumarine or quinolinon formation by a Heck reaction followed by a nucleophilic substitution



X = O,S X' = Halogen, OTf, OMs Z = O, NH

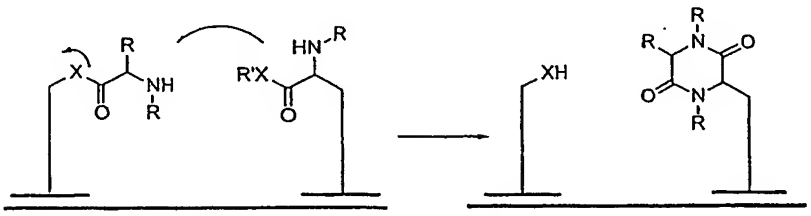
H. Acylation

Phthalhydrazide formation by reaction of Hydrazines and Phthalimides



I. Acylation

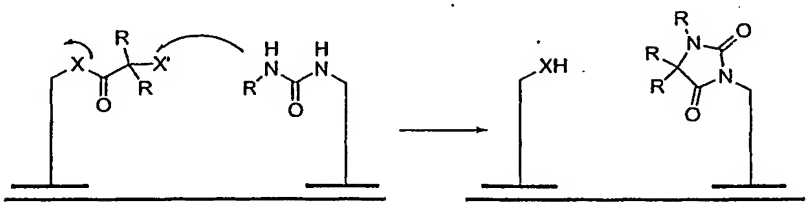
Diketopiperazine formation by reaction of Amino Acid Esters



X = O, S R' = H, R

J. Acylation

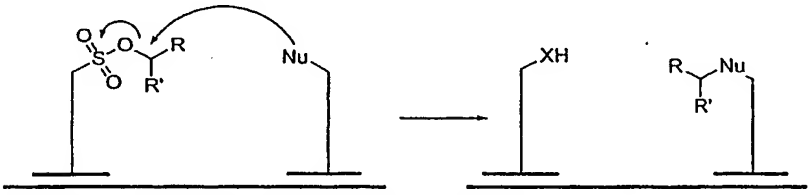
Hydantoin formation by reaction of Urea and α-substituted Esters



X = O, S X' = Hal, OTos, OMs, etc.

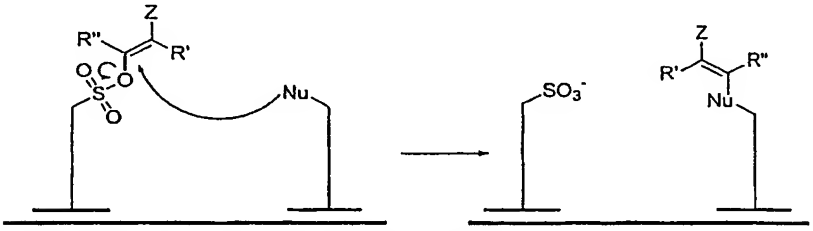
K. Alkylating monomer building blocks - principle

Alkylated compounds by reaction of Sulfonates with Nucleofiles



Nu = Oxygen- , Nitrogen- , Sulfur- and Carbon Nucleophiles

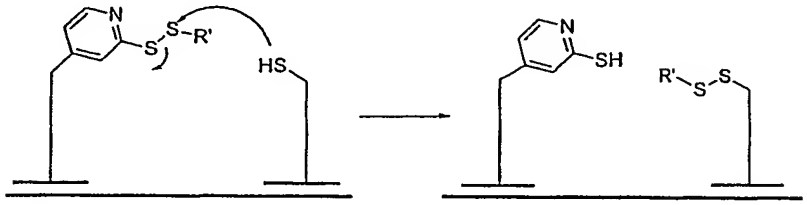
L. Vinylating monomer building blocks - principle



Z = CN, COOR, COR, NO_2, SO_2R, S(=O)R, SO_2NR_2, F
Nu = Oxygen- , Nitrogen- , Sulfur- and Carbon Nucleophiles

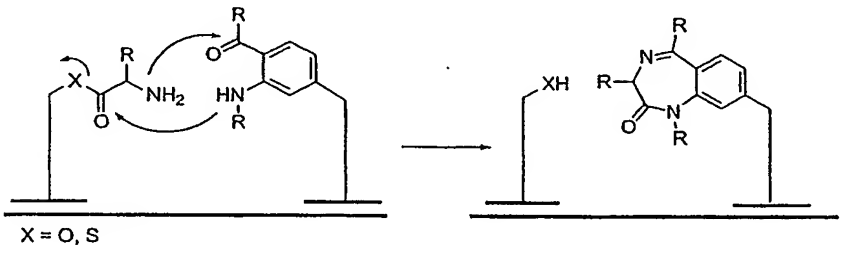
M. Heteroatom electrophiles

Disulfide formation by reaction of Pyridyl disulfide with Mercaptanes



N. Acylation

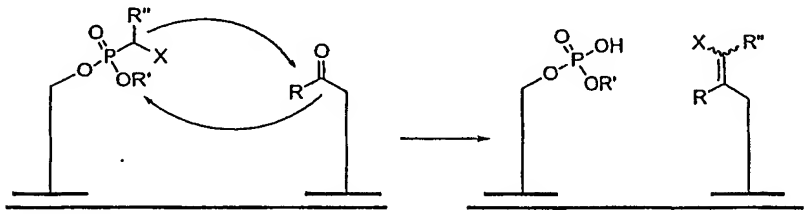
Benzodiazepinone formation by reaction of Amino Acid Esters and Amino Ketones



X = O, S

O. Wittig/Horner-Wittig-Emmons reagents

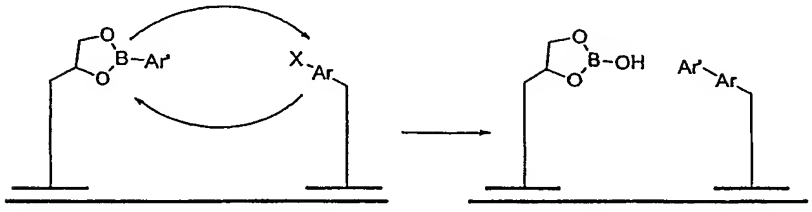
Substituted alkene formation by reaction of Phosphonates with Aldehydes or Ketones



X = EWG

P. Arylation

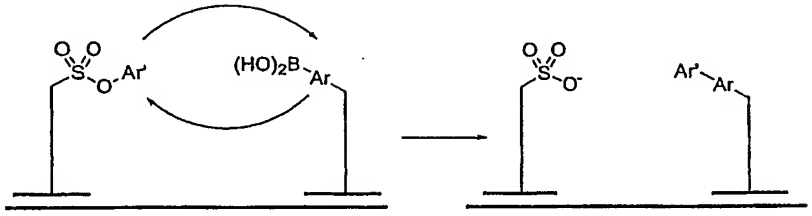
Biaryl formation by the reaction of Boronates with Aryls or Heteroaryls



X = Halogen, OMs, OTf, OTos, etc

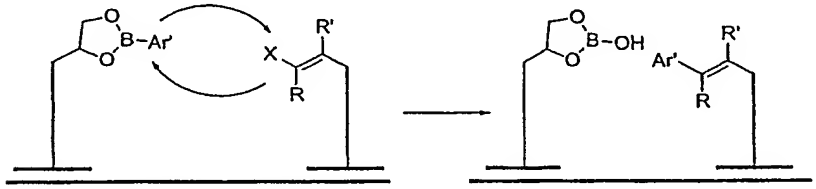
Q. Arylation

Biaryl formation by the reaction of Boronates with Aryls or Heteroaryls



R. Arylation

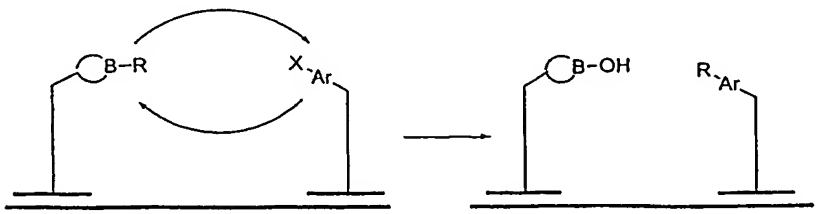
Vinylarene formation by the reaction of alkenes with Aryls or Heteroaryls



X = Halogen, OMs, OTf, OTos, etc

S. Alkylation

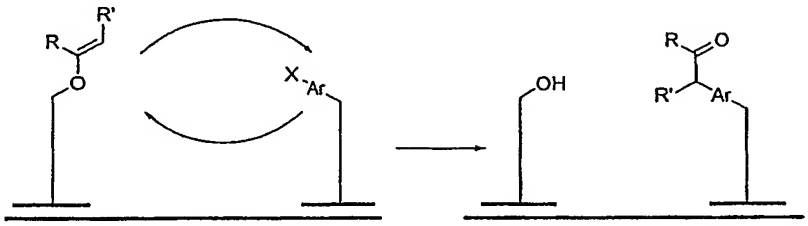
Alkylation of arenes/hetarens by the reaction with Alkyl boronates



X = Halogen, OMs, OTf, OTos, etc

T. Alkylation

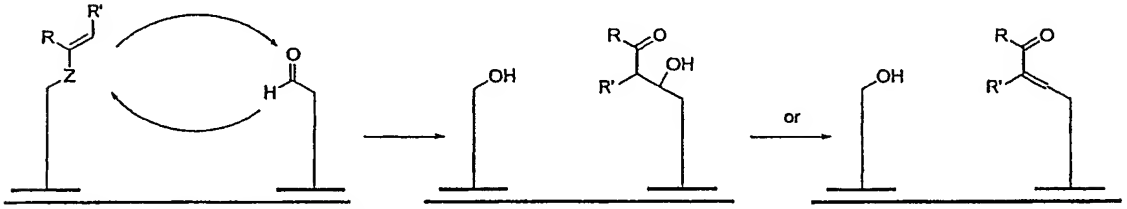
Alkylation of arenas/hetarenes by reaction with enolethers



X = Halogen, OMs, OTf, OTos, etc

U. Condensations

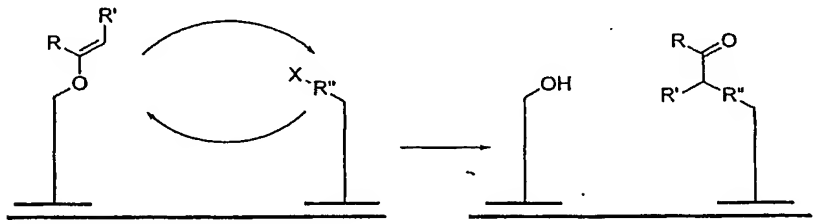
Alkylation of aldehydes with enolethers or enamines



Z = NR, O; X = Halogen, OMs, OTf, OTos, etc

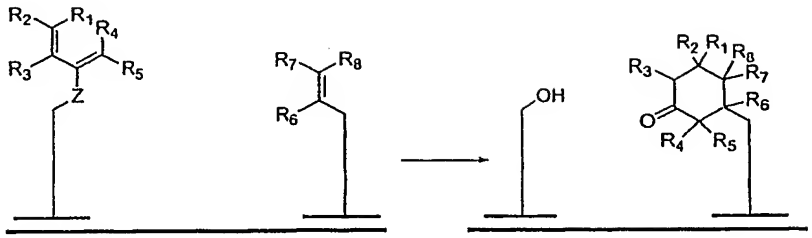
V. Alkylation

Alkylation of aliphatic halides or tosylates with enolethers or enamines



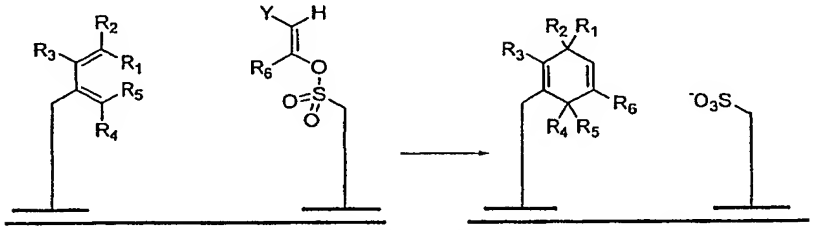
X = Halogen, OMs, OTf, OTos, etc

W. [2+4] Cycloadditions



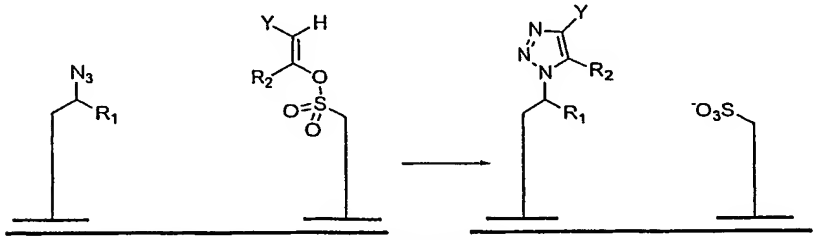
Z = O, NR

X. [2+4] Cycloadditions



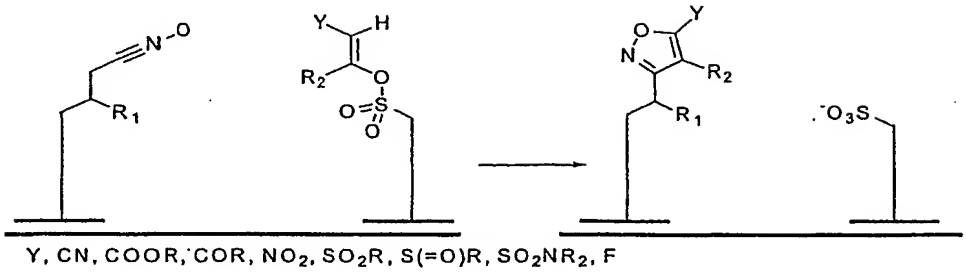
Y, CN, COOR, COR, NO_2, SO_2R, S(=O)R, SO_2NR_2, F

Y. [3+2] Cycloadditions



Y, CN, COOR, COR, NO_2, SO_2R, S(=O)R, SO_2NR_2, F

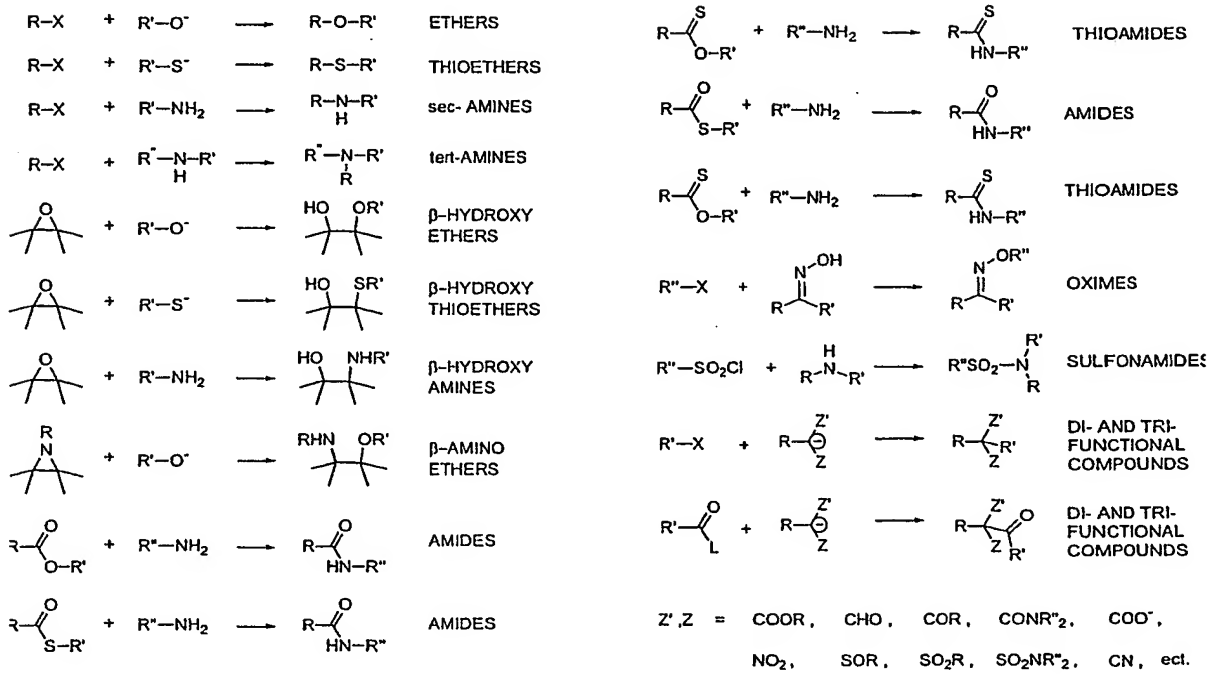
Z. [3+2] Cycloadditions



Y, CN, COOR, COR, NO_2, SO_2R, S(=O)R, SO_2NR_2, F

Fig. 5

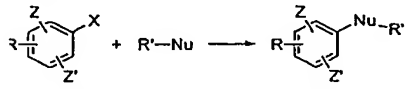
Nucleophilic substitution reaction



Z',Z = COOR, CHO, COR, $CONR''_2$, COO^-, NO_2, SOR, SO_2R, $SO_2NR''_2$, CN, ect.

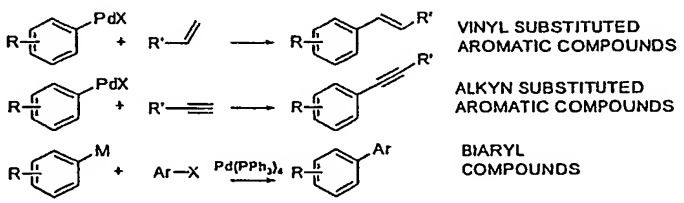
Aromatic nucleophilic substitution

SUBSTITUTED AROMATIC COMPOUNDS

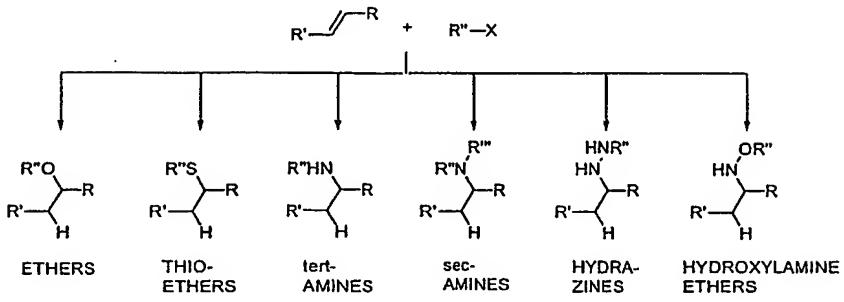


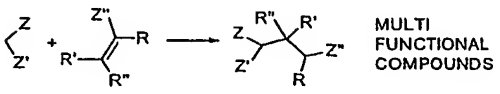
Nu = Oxygen-, Nitrogen-, Sulfur- and Carbon Nucleophiles
X = F, Cl, Br, I, OSO_2CH_3, OSO_2CF_3, OSO_2TOL, , , etc.
Z',Z = COOR, CHO, COR, $CONR''_2$, COO^-, CN, NO_2, SOR, SO_2R, $SO_2NR''_2$, , ect.

Transition metal catalysed reactions



Addition to carbon-carbon multiplebonds

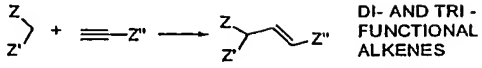




Z = H, Alkyl, Z', Ar

Z" = COOR , CHO , COR , $CONR"_2$, CN , NO_2 , SOR , SO_2R , $SO_2NR"_2$, , ect.

Z' = Z" R = R', = R", = Z

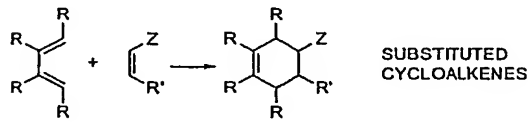


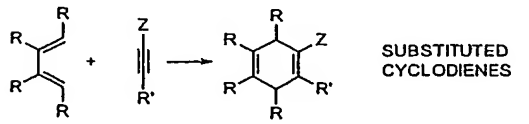
Z = H, Alkyl, Ar,

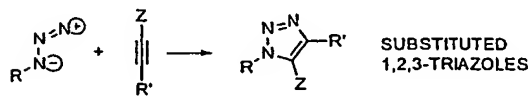
Z" = Z', Alkyl, Ar,

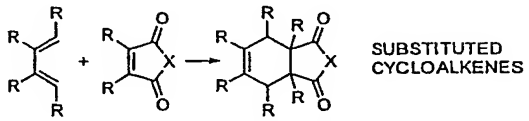
Z' = COOR, CHO, COR, $CONR"_2$, CN, NO_2, SOR, SO_2R, $SO_2NR"_2$, ect.

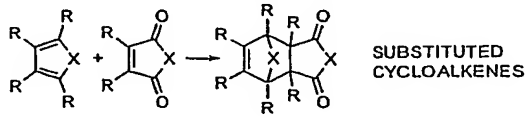
Cycloaddition to multiple bounds







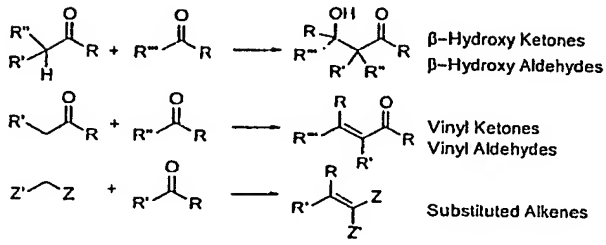


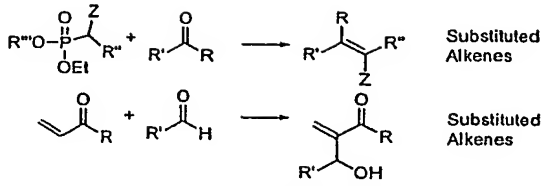


Z = COOR , CHO , COR , COOH COAr CN , NO_2 , Ar, CH_2OH, CH_2NH_2, CH_2CN, SOR, SO_2R etc.

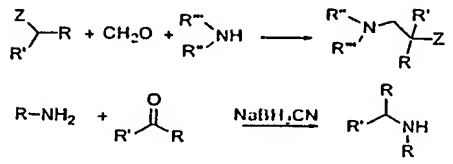
R = H, Alkyl, Ar, Z X = O, NR, CR_2, S,

Addition to carbon-hetero multiple bonds





Z, Z' = COOR, CHO, COR, $CONR''_2$, CN, NO_2, SOR, SO_2R, $SO_2NR''_2$, ect. R^n = H, Alkyl, Aryl



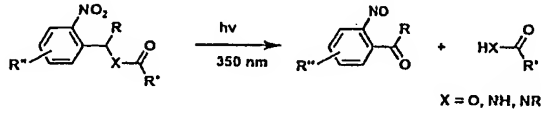
Z = COOR, CHO, COR, SOR, SO_2R, CN, NO_2, ect.

R = R', H, Alkyl, Ar,

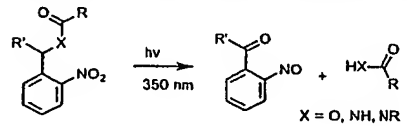
R'' = R''', H, Alkyl, COR,

Fig. 6

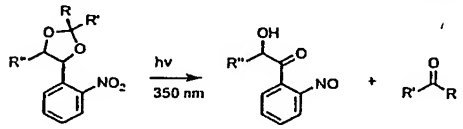
A. Linker for the formation of Ketones, Aldehydes, Amides and Acids



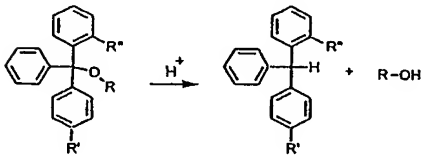
B. Linker for the formation of Ketones, Amides and Acids



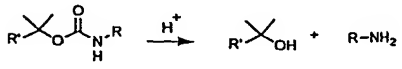
C. Linker for the formation of Aldehydes and Ketones



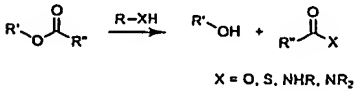
D. Linker for the formation of Alcohols and Acids



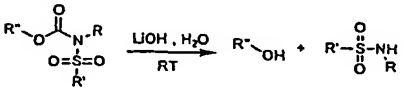
E. Linker for the formation of Amines and Alcohols



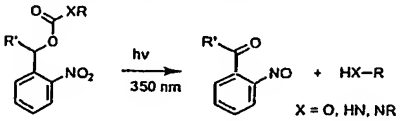
F. Linker for the formation of Esters, Thioesters , Amides, and Alcohols



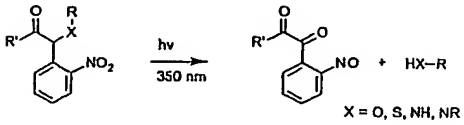
G. Linker for the formation of Sulfonamides and Alcohols



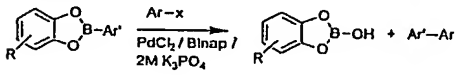
H. Linker for the formation of Ketones, Amines and Alcohols



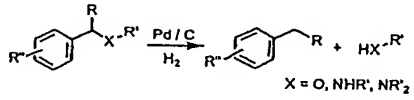
I. Linker for the formation of Ketones, Amines, Alcohols and Mercaptanes



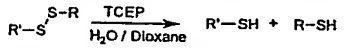
J. Linker for the formation of Biaryl and Bihetaryl



K. Linker for the formation of Benzyles, Amines, Anilins
Alcohols and Phenoles

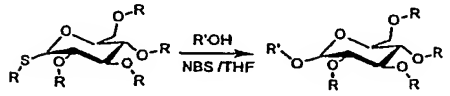


L. Linker for the formation of Mercaptanes

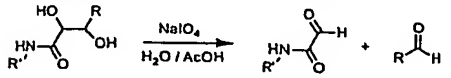


TCEP = tris(2-carboxyethyl)phosphine

M. Linker for the formation of Glycosides



N. Linker for the formation of Aldehydes and Glyoxylamides



O. Linker for the formation of Aldehydes, Ketones and
Aminoalcohols